

FLIGHT

The
**AIRCRAFT
ENGINEER
&
AIRSHIPS**

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1925

- Jan. 9 Mr. R. J. Parrott, Hons. Member: "The History and Evolution of the Avro Training Machine," before I.Ae.E.
- Jan. 23 ... Lieut. N. A. Olechnovitch, Member: "A Few Experiments with Shock-Absorbing Hulls for Flying Boats," before I.Ae.E.
- Feb. 5 Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., A.F.R.Ae.S.: "The Operation of Flying Boats in the Mediterranean," before R.Ae.S.
- Feb. 6 Professor E. G. Coker, D.Sc., F.R.S.: "Photo-Elastic Methods of Measuring Stress," before I.Ae.E.
- Feb. 19 Major R. V. Southwell, A.F.R.Ae.S. (Superintendent, Aerodynamics Department, National Physical Laboratory): (Title to be announced later), before R.Ae.S.
- Feb. 20 Mr. H. L. J. Hinkler: "Flying in Australia," before I.Ae.E.
- Mar. 5 Lieut.-Col. C. B. Heald, C.B.E. (Medical Adviser to the Director of Civil Aviation, Air Ministry): "Some Medical Aspects of Air Transport," before R.Ae.S.
- Mar. 6 M. E. Dewoitine: "The Advantages of Metal Construction," before I.Ae.E.
- Mar. 26 Dr. Eckener (Managing Director, Zeppelin Airship Co.): "Modern Zeppelin Airships," before R.Ae.S.

EDITORIAL COMMENT.



IN the whole, it can, we think, be said that the year just closing has been a fairly good one for aviation. During the period that the Labour Government was in power but little change in policy took place, those responsible for the defence of the Empire having the good sense to see that continuity was essential if our safety in the air was to be maintained. With Mr. Baldwin's Government in power, and Sir Samuel Hoare back at the 1924 Air Ministry, it may be assumed that the coming year will see steady development in all branches of aviation.

As far as the service side of flying is concerned, the scheme of expansion planned and commenced when Sir Samuel Hoare was previously in office was continued under Lord Thomson, and is to go on at, let us hope, increased rate during the next few months. The re-equipment of R.A.F. squadrons with modern aeroplanes has commenced, but it can hardly be said that the work has progressed as rapidly as had been expected, and the aircraft industry as a whole has not been overwhelmed with orders. Sufficient have, however, been placed to enable all the firms, some 20 or so, to remain alive, and perhaps that is even something to be thankful for. In this connection it is interesting and illuminating to compare conditions at home with those obtaining in France. The Paris aero show, recently closed, afforded a striking testimony to the general affluence of the French aircraft industry, a result of the much greater encouragement which the French Government gives to constructors. At the same time we are far from being convinced that the methods which are found to suit French conditions would be successful at home, and probably after all said and done we are better off by carrying on in "our own damn tinker fashion." There is one respect in which French methods seem to make for a more rapid rate of progress, and that is the encouragement given to new experiments. We should be the last to say that such experiments have always proved successful, but it does seem that if British constructors were given similar support (and incidentally

relieved of some of the official meddling which is now retarding progress), we should have produced some aeroplanes really worth while. Our designers are second to none in the world, and if they are inclined to be conservative they are at least thoroughly sound and can be relied upon not to produce "freaks." The Paris Aero Show gave an indication that French constructors generally are, after a period of rather wildly launching out with impossible and often fantastic contraptions, coming down to earth and are beginning to realise that there is no short cut to super-efficiency. That a certain amount of money must have been wasted in teaching that lesson may be granted, but who will doubt that the lesson has been learnt, and that our friends across the Channel are all the better for their experience. The necessary corollary is that France may now be expected to turn out better and better aeroplanes, and what with her vigorous propaganda abroad is becoming, or indeed has become, a very serious competitor in the world's aeroplane market. It is, of course, perfectly true that the rate of exchange has a great deal to do with the preference sometimes shown by foreign purchasers of aircraft and aero engines (for example, we understand that the price of the new 600 h.p. Renault aero engine is only 85,000 francs, or approximately £1,000, which is only about one-third of what a similar engine would cost in this country), but at the same time concerted action by the S.B.A.C., with a certain amount of assistance by the Air Ministry, would undoubtedly do a good deal towards impressing foreign nations with the qualities of British aircraft. The warning is there for all concerned, pointing the moral that unless more energetic measures are taken than have been the rule in the past, Great Britain will soon find herself seriously menaced by French and American (at present the only ones that matter, although others are coming along) competition.

The airship scheme inaugurated during 1924, or at any rate brought to concrete form, is not likely to result in the actual completion of new airships in the coming year, but it is hoped that one or two re-conditioned airships will be flying during 1925 for the purpose of carrying out full-scale tests and for training personnel.

In the sphere of commercial aviation, the year has seen the amalgamation of the four air transport firms into one large company, officially known as Imperial Airways, Ltd., but known colloquially as the Million Pound Monopoly Company, which receives a large subsidy, spread over a period of ten years. So far it cannot be said that the new company has shown any great desire to obtain new and more efficient flying stock, and, on the whole, Imperial Airways have mainly confined their policy to carrying on much in the same way as did the four separate companies. Of the extensions of the various lines, about which a great deal has been written and spoken, there is still no sign, nor do we seem to be much nearer to the really commercial aeroplane. Up to the present,

Imperial Airways have had the very good reply to any criticism that all these developments take time. That will not be disputed, but, so far as we have been able to discover, very little has been done in the materialisation of new machines, although tenders have been asked for and many submitted.

In sporting aviation, the year cannot very well be claimed to have been a satisfactory one as far as Great Britain is concerned; while many new world's records have been established, *not a single one* stands to the credit of British aircraft. In the matter of speed, France has within the last week or so wrested the record from America, and that with a margin which will be extremely hard to beat. Similarly, with the duration record, where France beat with a Farman machine the record held by America, and without refuelling at that. Of the two International events in which Britain was expected to figure, one was cancelled for lack of entries (the Aerial Derby), and in the other (the Schneider Cup seaplane race) one of our entries was not finished in time, while the other came to grief during a trial flight. This incident was all the more regrettable as the machine in question showed a very excellent turn of speed and demonstrated that with more adequate preparation, and with the necessary Government assistance, our firms can produce machines capable of holding their own with those of any other nation. There must be no delay in getting to work on the 1925 Schneider Cup machines, so that they can be thoroughly tested out before the event, and not sent to America as untried experiments. The Americans were thoroughly good sportsmen over the Schneider Cup this year, refraining from claiming a "walk-over" when they could well have done so, and the least we can do is to make sure of sending three really fine machines to America in 1925.

In light 'planes, Great Britain can now justifiably claim to lead the world, and although we have certainly not yet discovered the "ideal" machine, we have got better performance out of our low-powered aeroplanes than has any other nation in the world. The scheme for light aeroplane clubs has been inaugurated, and if all interested work with a will, 1925 should see the class firmly established, the more so as the Royal Aero Club has decided to grant certificates of performance to light aeroplanes, for speed, speed range, and climb. What now chiefly remains to be done is to define clearly what constitutes a light 'plane (for paradoxical as it may seem, in spite of the excellent work that has been done, we have not yet definitely defined the light 'plane) and the sort of performance we want. At present this has not been done, and until it is constructors cannot possibly build machines to meet the requirements.

Briefly summarised, it can, we think, be said that 1924 was devoted chiefly to planning and to original spade work. May this bear fruit in 1925, so that in a year's time FLIGHT may be in a position to record real progress and an aviation community soundly and firmly established.

A MERRY CHRISTMAS TO ALL

Hearty Good Wishes of the Season to all our readers—reciprocating
the many Greetings received from the four Quarters of the Globe.



THE PARIS AERO SHOW 1924

(Concluded from p. 791.)

PIERRE LEVASSEUR

SPECIALISTS in *avions marins*, the Pierre Levasseur firm have this year produced a new type of more than usual interest. In previous years M. Charles Fréchet, the very energetic and always amiable managing director of the firm, has had torpedo planes and other craft to show, but this year he has gone a step farther and has produced a type that appears destined to have a very great future. The principle adopted is so simple that one wonders it has not been generally adopted before, and yet the machine would seem to fulfil certain very important requirements in connection with naval co-operation work where a good performance is a valuable asset. Put very briefly, the idea underlying the design of the Pierre Levasseur *avion de chasse marin biplace* is to provide a machine suitable for work over the sea, capable of taking off from and alighting on the deck of a vessel, having approximately the performance of a land aeroplane of the two-seater fighter type, and being able withal to alight on the sea with reasonable safety should the necessity arise. In the Pierre Levasseur machine all these rather conflicting requirements seem to have been met in a very simple and most ingenious way, the machine being a compromise, certainly, but a compromise which seems to promise extremely well. Although the particular Levasseur biplane is a fighter and reconnaissance machine, there does not appear to be any reason why the same principles could not be applied to commercial machines, in which case a forced alighting on the sea might not have very serious consequences.

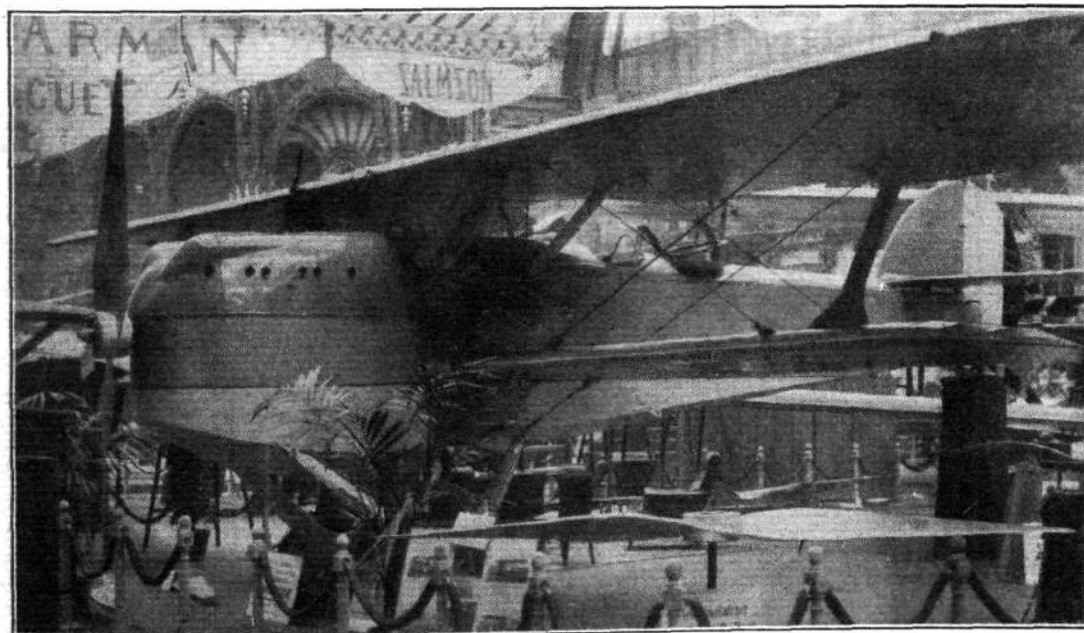
The Levasseur *avion de chasse marin* is, as shown in our photograph, a tractor biplane of fairly orthodox design in its general lay-out. The only notable departure from general practice is the high position of the lower plane. This has, of course, been necessitated by the fact that when the machine

is forced to alight on the sea it will float with the lower portion of its fuselage submerged, and it was considered desirable to keep the lower plane clear of the water. This it probably is in a calm sea, at least according to the waterline painted on the sides, but in anything of a seaway the lower wing would doubtless be partly awash. As this wing is of fairly small area, this fact would probably not greatly matter, and in any case the machine is not, and is not intended to be, a sea-plane, so that seaworthiness can scarcely be expected. All that the designers intended was to afford the crew a sporting chance in case of a forced descent.

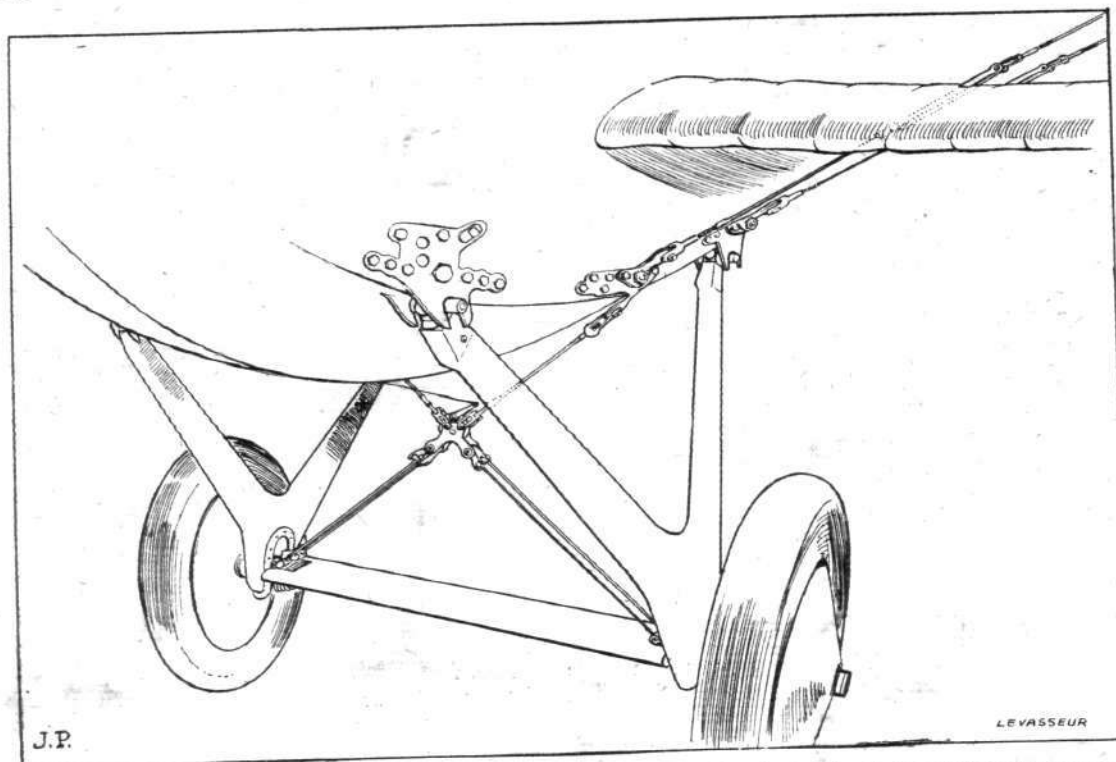
Owing to the high position of the lower plane, the wing bracing is a little unusual in that the lift wires pass through the bottom plane. This could only have been avoided either by placing the fittings above the wing root, in which case the angle would have been poor, or else by running the front wire forward to a point ahead of the wing and the rear wire aft clear of the trailing edge. The designers chose to keep the lift wires in the plane of the struts and run them through the lower plane.

The fuselage is of usual Levasseur construction, but the lower portion has been covered with three-ply up to a height of a little over a foot, and transverse bulkheads in the floor project upwards to above the waterline so that should the machine puncture its fuselage in alighting, the water would not spread to the other compartments. A certain amount of fuselage space is, of course, more or less wasted in this way, but this was probably unavoidable. The bottom of the fuselage is of the vee type, and it seems likely that the machine, with its undercarriage dropped, would alight with very little splash.

The undercarriage is shown in a sketch. It is of usual vee type, but the struts fit into slots in the steel plates on the



The Pierre Levasseur two-seater fighter has a "droppable" undercarriage and Vee bottom so as to enable it to alight on the sea.



The undercarriage of the Pierre Levasseur can be dropped by releasing the lateral bracing wires. When the lever in the centre of the wires is pulled over to starboard the wire attachments slip out of their slots, and the struts fall out of the forked fittings.

lower longerons, and are only held in position by the bracing wires. The latter are locked at the point of crossing by an eccentric device with slots, so that when the small lever is pulled to starboard the cables fall out of their slots and the undercarriage drops.

The main characteristics of the Pierre Levasseur are: Engine, 450 h.p. Hispano-Suiza. Length o.a., 8.8 m. (28 ft. 11 ins.); wing span, 12.4 m. (40 ft. 9 ins.); wing area, 37 sq. m. (400 sq. ft.). Weight empty, 1,150 kgs. (2,530 lbs.); fuel and oil, 300 kgs. (660 lbs.); useful load, 350 kgs. (770 lbs.). Total loaded weight, 1,800 kgs. (3,960 lbs.).

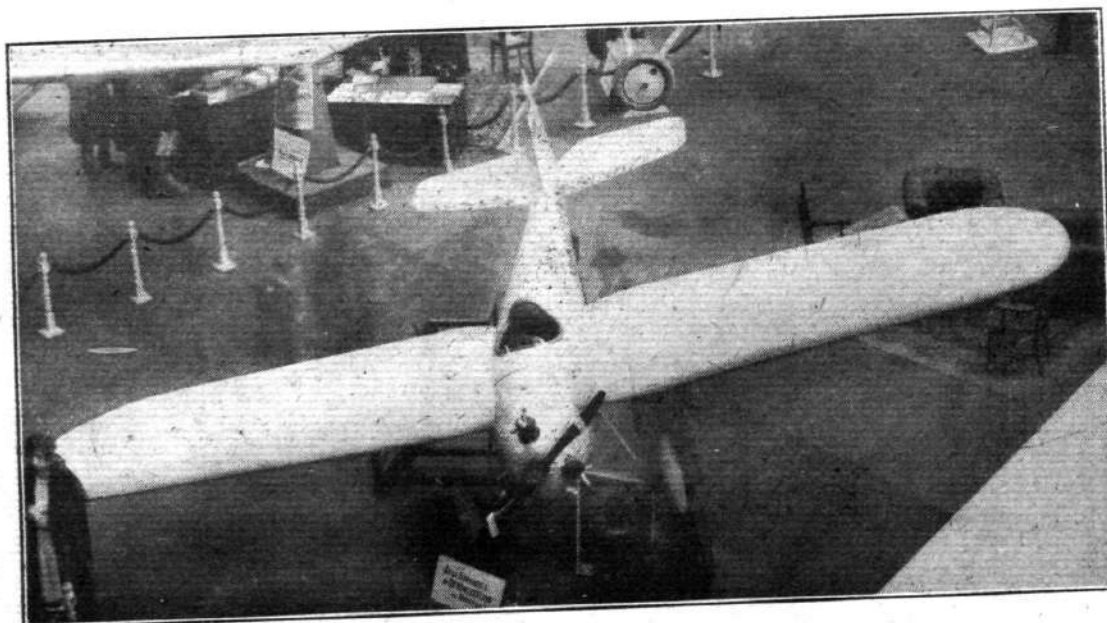
The *avion marin* exhibited in 1922 is shown again this year, but with its covering on. This machine has successfully alighted on the water on several occasions. Pierre Levasseur also shows Levasseur-Reed metal propellers, the French rights for which have been secured by this firm. The S.I.M.B., which recently established a new world's speed record, was fitted with one of these propellers.

THE PANDER LIGHT MONOPLANE

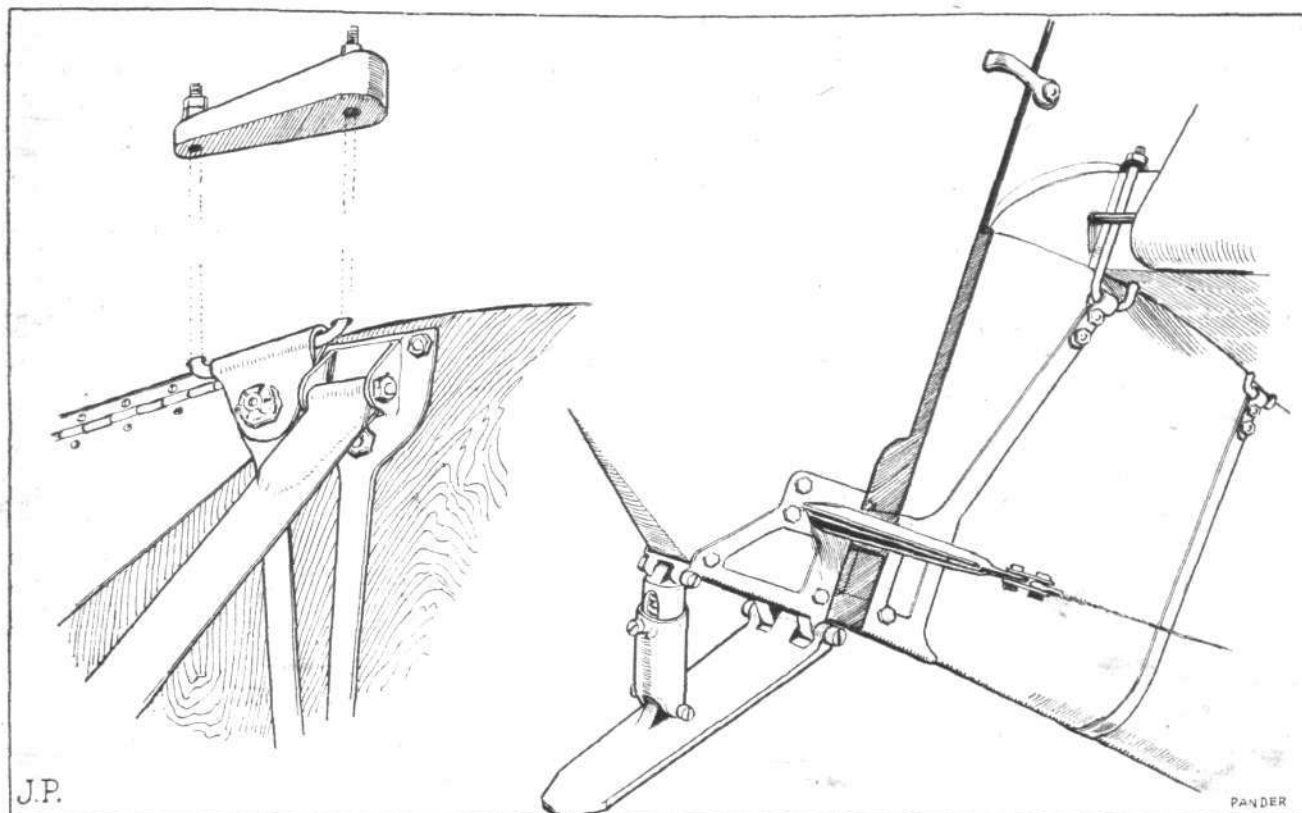
REGARDED by many as the prettiest and best-finished aeroplane in the Grand Palais, the little monoplane exhibited by H. Pander en Zonen, of the Hague, Holland, is a perfectly normal cantilever monoplane as regards its general lines, but the forms of construction adopted, are somewhat unusual, and the

method of carrying them out, in other words the workmanship, is highly commendable. It is not claimed that the Pander is a particularly cheap machine, but it is a very light machine as regards structure weight, and as the factor of safety is high (about $7\frac{1}{2}$) it is to be assumed that the weight has been reduced by the most painstaking attention to detail.

Three-ply is extensively used in the construction of the Pander monoplane, and where the usual sheet three-ply is not used, laminated or multi-ply is employed in its place. Thus the fuselage has formers of laminated construction, something after the fashion of the familiar hoop, and although in themselves light, some are spindled out to a V- or U-section in order further to reduce weight. The longerons, of which there are four main ones and one at top and bottom of cross section, are notched into the hoops, which are swelled and reinforced at these points. The very light skeleton thus formed is then covered with thin three-ply, and never in all our experience have we come across a finer example of ply-wood covering. It is true that the fuselage of the show machine was painted, but even so one would have expected to be able to see or, at any rate, feel a joint somewhere. Yet none was to be discovered. Not only so, but nowhere was the three-ply covering found to buckle, as thin three-ply usually does. The whole surface was perfectly smooth on sides as well as on upper and lower fairings. The actual sides are flat, but the



The prettiest machine in the Show: The Pander light monoplane, with Y-type Anzani.



ON THE PANDER LIGHT MONOPLANE: On the right the sprung tail skid, which is mounted on, and moves with, the rudder. On the left the attachment of the rear chassis strut and rear spar U-bolt. Straps run down the sides of the monocoque fuselage so as to distribute the loads.

change into the deck and floor fairings is so gradual that on casual inspection one fails to notice that there is a flat portion, the section giving the appearance of being perfectly elliptical.

The wing construction is entirely in wood, there being two spars as in ordinary practice. The front one, however, forms a box in conjunction with the ply-wood covered leading edge, and struts arranged in a rather peculiar way serve to stiffen the cantilever wing against torsion.

The V undercarriage is built up of streamline steel tubes, the upper ends of which are bolted to the sides of the fuselage, the load being distributed by steel straps running under the belly of the fuselage, as shown in our sketch. The same fitting serves for the wing attachment, which is in the form of a long U-bolt passing through the wing and anchored at the top with locknuts and a short yoke. The wing, incidentally, is in a single piece, the spars passing across the fuselage, and the coaming around the cockpit being placed in position after the wing is in place. Owing to the U-bolt arrangement, however, the wing is readily removed.

It is not proposed to give a very detailed description of the Pander light monoplane here, as we hope to deal with it more thoroughly in a subsequent issue of *FLIGHT*. The main characteristics may, however, be of interest: Length, o.a., 4.95 m. (16 ft. 3 ins.); span, 8 m. (26 ft. 3 ins.); wing area, 10.8 sq. m. (116.3 sq. ft.); weight of machine empty, 175 kgs. (385 lbs.); weight loaded, 280 kgs. (616 lbs.); engine, 30 h.p., Y-type Anzani; power loading, 20.5 lbs./h.p.; wing loading, 5.3 lbs./sq. ft.; maximum speed, approximately 130 km./h. (81 m.p.h.); landing speed, 40 km./h. (25 m.p.h.). One of the Pander light monoplanes was flying at le Bourget during the Paris Aero Show, and several famous French pilots tried it and expressed themselves highly delighted with its performance and handling.

THE SCHNEIDER ALL-METAL MONOPLANE

A MACHINE of very unorthodox design is that exhibited by the famous Creusot firm of Schneider et Cie. At first glance one is tempted to dismiss the machine as a "freak," the twin fuselages, the large central nacelle for the crew, and the two combined engine housings and undercarriages all tending to convey the impression that the machine was simply built to use up as much *Alferium* as possible (this being a new aluminium alloy produced by the Schneider firm). On closer examination, however, one begins to realise that there is more in the design of the machine than is apparent at first, and that it is at any rate entitled to serious consideration even if one cannot quite agree with all the details of the design.

Fundamentally the Schneider monoplane is designed to give

a good view and field of fire in all directions. It does not appear, however, that this has been altogether attained, as although the field of fire is excellent from the forward gunner's cockpit, and reasonably good aft from the rear cockpit, there would seem to be a "blind" zone laterally from the rear cockpit. Provision is made for firing downward from this cockpit through a trap door in the floor. The armament consists of six machine-guns, and wireless outfit and camera are also carried.

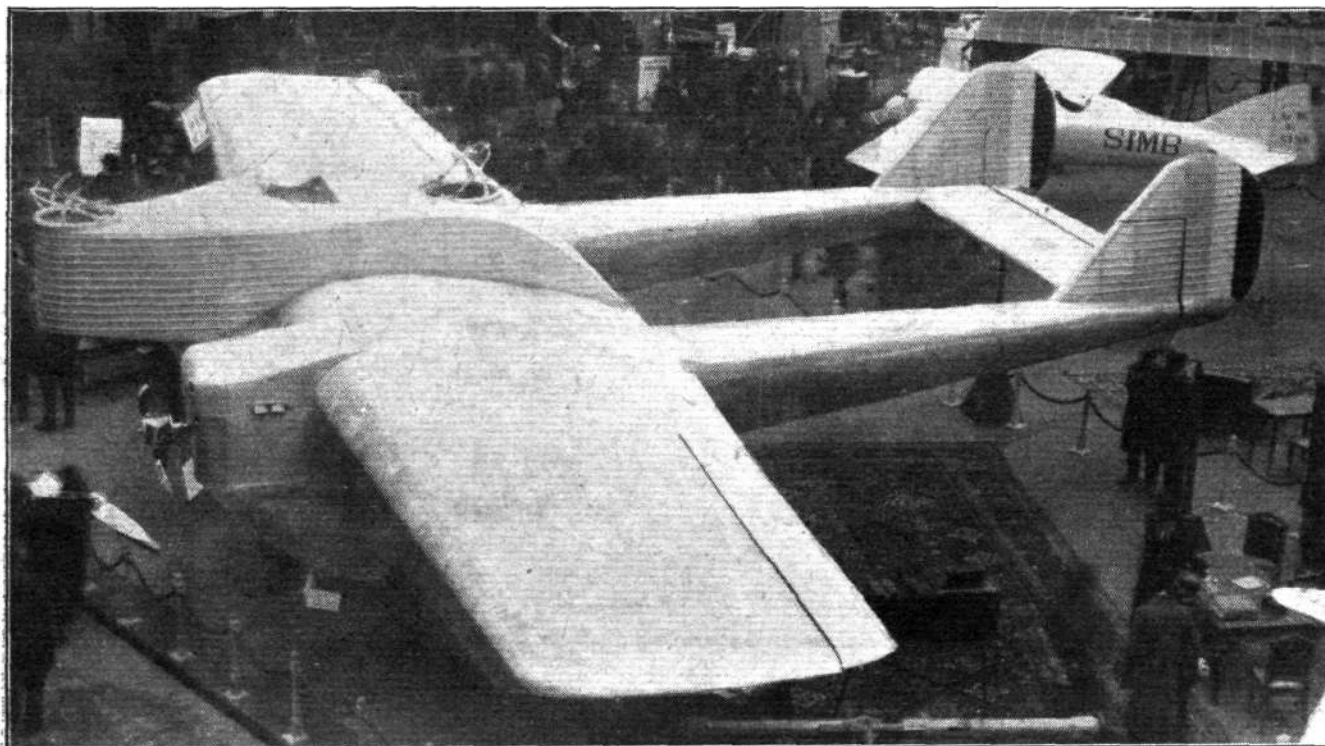
The large monoplane wing is in a single piece, and must present rather a problem as regards transport. The nacelle containing the crew can be detached from the wing in a fairly short time, as can also the rear portion of the two fuselages, the joint occurring just aft of the trailing edge of the wing. The wing is constructed entirely of *Alferium*, there being two main spars and a lattice work at top and bottom to form, with the spars, a sort of box. The wing covering is also of *Alferium*, and is corrugated at intervals of approximately 3 inches.

The two fuselages, extending forward to form engine housings and undercarriages, are also entirely built of *Alferium*, but in this case the covering is in the form of plain sheets (*i.e.*, not corrugated). At the stern each fuselage carries a fin and a rudder, and the large fixed tail plane runs right across, from one fuselage to the other, a one-piece elevator being hinged to it.

All controls are operated by rods and tubes, no cables being employed, and all cranks, etc., used in the control system work in ball bearings. This is stated greatly to lighten the work of the pilot, and certainly recent de Havilland aeroplanes in which ball-bearings have been used for the controls are remarkable for the ease with which the joy-stick can be manipulated.

The two undercarriages are in the form of parallel Vees, one pair for each wheel, consisting of a forward large box-section legs and smaller rear legs. The axle rests in a movable fork, sprung from the fixed vees by rubber shock absorbers situated inside and near the upper end of the fixed vees. As the whole of the undercarriage is enclosed the head resistance is probably very low, but it would appear that the chassis cannot be particularly strong laterally unless the weight is considerable. The wheel track is, of course, very wide, and there should be very small chance of the machine turning over on to a wing tip.

The two 400 h.p. Lorraine-Dietrich engines are supported on cantilever structures joined partly to the wing structure and partly to the fuselages. They are entirely cowled-in, and a radiator is mounted on each side of the engine nacelles. The petrol tanks are placed aft of the engines, and in this position would seem to afford a maximum degree of safety from fire,



THE ALL-METAL SCHNEIDER TWIN-FUSELAGE MONOPLANE : This machine, built of a new aluminium alloy produced by the famous Creusot firm under the name "Alferium," carries an armament of six machine-guns.

since, should a tank be holed by a machine-gun bullet, the petrol would simply run out without touching any portion of the machine. As far as we were able to discover, no jettison valves were fitted, but this could be very easily done if desired, the arrangement of the tanks lending itself particularly to the installation of such valves.

The main characteristics of the Schneider Sch. 10, type M, are as follows : Length o.a., 11.7 m. (38 ft. 5 in.) ; total height, 3.3 m. (10 ft. 10 in.) ; wing area, 57 sq. m. (613 sq. ft.) ; weight empty, 2,650 kgs. (5,830 lbs.) ; useful load, 1,000 kgs. (2,200 lbs.) ; total loaded weight, 3,650 kgs. (8,030 lbs.). The estimated top speed at an altitude of 5,000 m. (16,400 ft.), at which the machine intended to operate, is 220 km./h. (137.5 m.p.h.), and the ceiling is estimated at 7,000 m. (23,000 ft.).

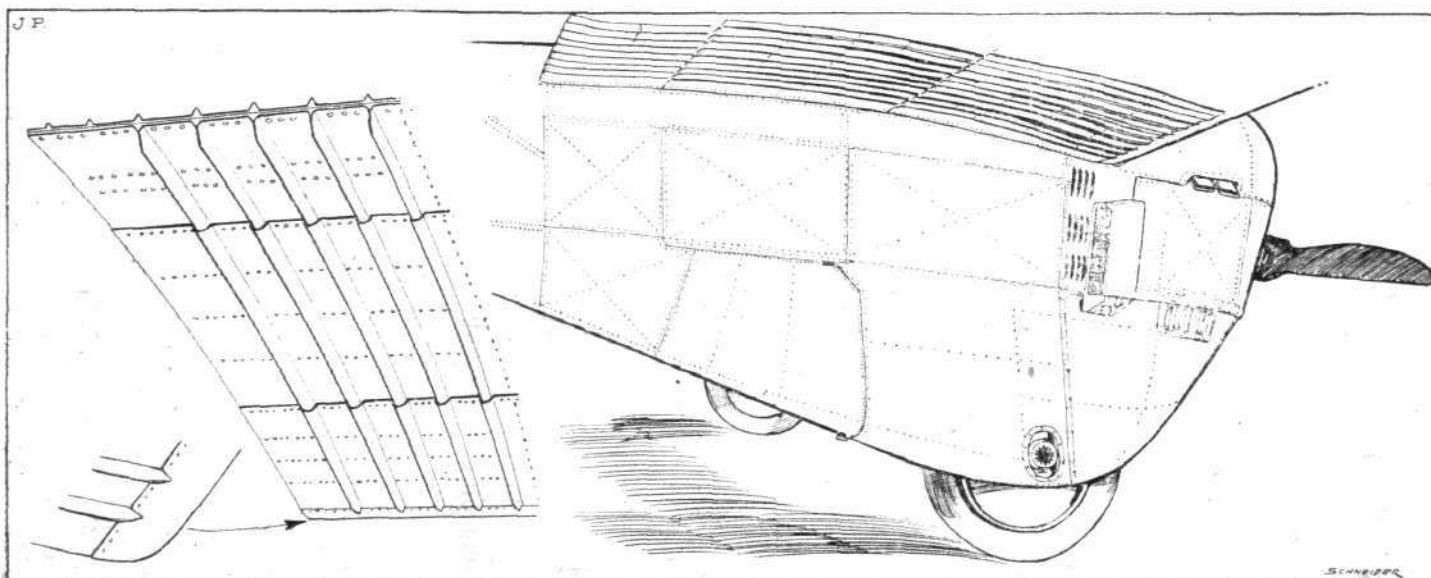
SOCIETE D'EMBOUITISSAGE ET DE CONSTRUCTIONS MECANIQUES

THREE machines were exhibited by the S.E.C.M. firm, two of which were school machines, while the third was a large single-engined night bomber. Of the two school machines,

one was shown complete and the other in skeleton, and as they were very similar to machines exhibited at previous shows it does not appear necessary to deal with them in detail here. A Dewoitine D. 1 C. 1 was also shown, presumably because the S.E.C.M. build these in series for Dewoitine.

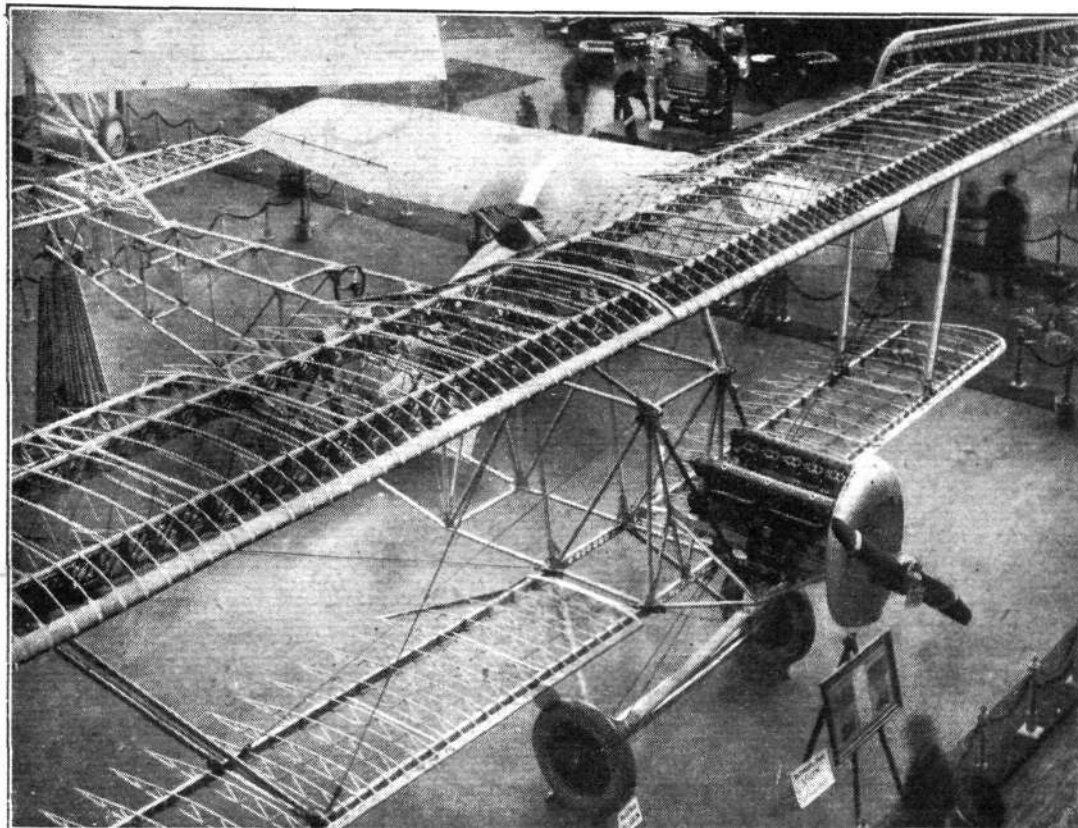
The S.E.C.M. type 12 B.N. 2 is fitted with one of the large 600 h.p. Renault engines, and was shown in skeleton so that the detail construction could be examined. Unfortunately the gentleman in charge of the stand had received instructions not to permit detail sketches to be made, and as a special permission for FLIGHT's artist could not be obtained in time, we regret that we are not able to give sketches showing S.E.C.M. methods of metal construction. Otherwise we should have liked to publish a set similar to that showing Breguet construction, and published in our December 18 issue.

With the exception of a few wing fittings, etc., the S.E.C.M. metal construction employs Duralumin exclusively, and the material is used for the most part in the form of Duralumin tube. Thus, the fuselage is a tubular structure with wire



THE ALL-METAL SCHNEIDER TWIN-FUSELAGE TWIN-ENGINE MONOPLANE : The sketch on the right shows one of the engine nacelle-undercarriage fuselages. The petrol tank is mounted aft of the engine and landing gear, so that in case of puncture by machine-gun fire the petrol is drained out without danger of setting the machine on fire. On the left is shown the corrugated wing covering and the manner of its attachment at leading and trailing edges.

The S.E.C.M. all-metal night-bomber, type 12 B.N.2, is shown in skeleton. The metal construction is very pretty, but one doubts whether some of the complicated joints are really necessary.



bracing, the struts being joined to the longerons by relatively thin Duralumin plates wrapped around longerons and struts and pressed out to conform to the curvatures of the tubes, while meeting over the centre lines and riveted together. The construction is very pretty, and some of the joints are works of art. The joint of the front chassis strut to the lower longerons, at a point where several struts of the fuselage and engine mounting converged, was in particular a very remarkable piece of work, and the manner in which the S.E.C.M. firm bends and presses the Duralumin plates is perfectly astounding, but one confesses to a feeling that, beautiful as the work is it seems rather unnecessary.

The wing structure of the night bomber consists of a large top plane and a smaller bottom wing. The spars of the latter are in the form of drawn rectangular section tubes, while the upper spars are built-up of sheet Duralumin walls flanged and stamped for lightness and forming a series of N's in front view, and of flat top and bottom flanges riveted to the walls *via* L-section strips. The flat spar flanges are then reinforced by curved U-section strips placed above and below the top and bottom flanges respectively.

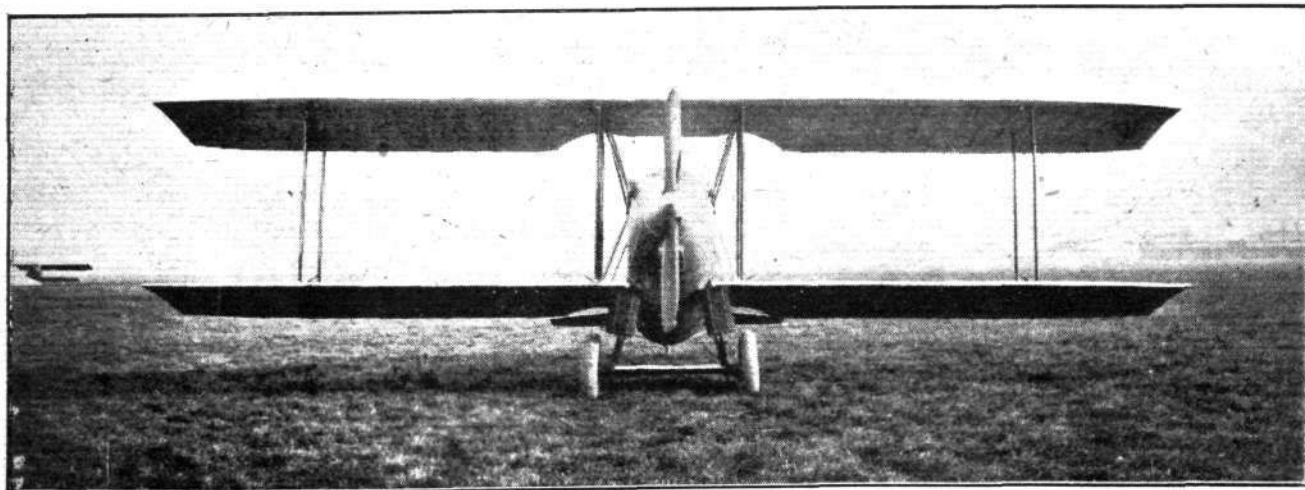
The wing ribs are of tubular construction as regards both flanges and webs, the latter being arranged in a zig-zag or Warren truss formation. Joining is by tubular rivets passing

through flanges and lattice bars and through the sheet with which, as in the fuselage, the joint is wrapped. In connection with the S.E.C.M. method of construction it is of interest to note that the firm state that a complete all-metal rib can be produced in 41 minutes, most of the work being done by girl workers. The Duralumin plates used in making the joints are, of course, stamped out from the flat sheet, and once the necessary dies are made probably the work is fairly rapid. Thus, for quantity production the S.E.C.M. method is probably both rapid and reasonably cheap.

The main characteristics of the S.E.C.M. 12 B.N. 2 are: Length o.a., 14 m. (45 ft. 11 in.); wing span, 19 m. (62 ft. 3 in.); wing area, 85 sq. m. (915 sq. ft.). Weight empty, 1,760 kgs. (3,870 lbs.); fuel and oil, 700 kgs. (1,540 lbs.); useful load, 940 kgs. (2,070 lbs.); total loaded weight, 3,400 kgs. (7,700 lbs.). Top speed, 200 km./h. (125 m.p.h.); landing speed, 80 km./h. (50 m.p.h.). Climb to 5,000 m. in 45 minutes. Duration 6 hours.

RENE TAMPIER

M. RENE TAMPIER has for several years made a special study of the *avion automobile*, i.e., the aeroplane capable of proceeding, with wings folded, along a road or street, the power necessary for this purpose being derived from a small auxiliary motor



Front view of the Tampier T.4, which has folding wings. A two-cylinder starting engine is fitted.

A black and white photograph showing the underside of a car chassis. The view is from below, looking up at the rear section. Two large, dark, solid wheels are visible on the left and right. A horizontal axle connects them, with a central differential housing. Above the axle, there are vertical suspension components, including what appear to be shock absorbers or coil springs. Diagonal cross-braces are visible, connecting the upper frame to the lower suspension area. The car's body is visible at the top of the frame, showing the underside of the rear end. The background is a light-colored, possibly concrete floor, with some indistinct shapes in the distance.

wings. In the Tampier, however, they are part of the main wing structure.

The Tampier T. 3 is provided with the four-cylinder type, placed transversely in the fuselage, immediately aft of the main engine, and is used for road transport as well as for starting and generating purposes. In the T. 4 a two-cylinder unit is fitted, and is used for starting and generating only, this machine not being of the automobile type.

Several other interesting machines were exhibited at the Paris Show, but as we desire to finish the series of articles dealing with the Paris Show in the present volume of FLIGHT, we have had to omit reference to a number of the types exhibited.

Next week an article will be published dealing briefly with some of the more interesting aero engines exhibited, and this will conclude our report on the Paris Exhibition.

Sir Sefton Brancker's Air Tour

RESUMING his flight to India on December 18, Sir Sefton Brancker left Aleppo for Baghdad, on the D.H. 50, piloted by Alan Cobham.

London-Berlin Air Service

UNLESS the negotiations, now in progress, to revise the restrictions laid down in the Versailles Treaty in regard to the construction of German aircraft come to a satisfactory settlement, the London-Berlin air service operated by Imperial Airways, Ltd., will have to be discontinued—or considerably modified—after December 31. Meanwhile, it is hoped a provisional agreement for a few months will be made.

Air Minister's Lunch to Foreign Attachés

SIR SAMUEL HOARE, Secretary of State for Air, gave a luncheon at the Ritz Hotel on December 18 to the foreign attachés in London who are responsible for aviation. The attachés present were: Capitan de Fregata Don Jorge A. Games (Argentina), Lieut.-Col. Don Raul Mones Ruiz (Argentina), Major Don Guillermo Zavala (Chile), Comdr. Don Edgardo von Schrooders (Chile), Lieut.-Col. Dr. Rudolf Jac (Czechoslovakia), Capitaine de Fregata L. Sable (France), Captain George Panas, C.M.G. (Greece), Commandanti de Squadriglia S. Scaroni, C.V.O., D.F.C. (Italy), Capt. Teijiro Toyoda, D.S.O. (Japan), Maj.-Gen. Ren-ichiro Okamoto (Japan), Col. Jon Antonesco, C.M.G., C.V.O. (Roumania), Col. de l'Etat Major Georges Ostoic, K.C.V.O., C.B. (Yugoslavia), Col. Don. Fernando Rich (Spain), Col. E. Mossberg.

O.B.E. (Sweden), Comdr. A. de Bahr, C.V.O. (Sweden), Capt. Luke McNamee (United States), Lieut.-Col. Kenyon A. Joyce (United States), and Major Howard C. Davidson (United States).

From the Air Ministry there were present: Sir Philip Sassoon, M.P., Air Chief Marshal Sir H. M. Trenchard, Air Marshal Sir John Salmond, Air Vice-Marshal Sir Geoffrey Salmond, Sir Walter Nicholson, Air Commodore J. M. Steel, Sir S. Dannreuther, Mr. H. W. W. McAnally, Air Commodore D. le G. Pitcher, Air Commodore T. C. R. Higgins, Mr. C. Ll. Bullock, Sir Geoffrey Butler, M.P., Sqdn.-Ldr. A. R. Boyle, Sqdn.-Ldr. C. R. Cox, and Flight-Lieut. A. Gambier-Parry.

An Australian Air Force Pageant

The first Australian Air Force pageant in aid of charities was held at Flemington Racecourse, Melbourne, on Saturday, December 13.

Officers for Fleet Air Arm

As a result of experience gained during the recent course at Netheravon for naval officers attached to the Fleet Air Arm, it has been found desirable to divide future courses into two parts, a senior and a junior section, each lasting three months. The courses for 1925 will consequently be:— Junior section, January 12 to April 15, May to July, August to November, and November to February, 1926; Senior section, May to July 30, August to November, November to February, 1926, and March to May, 1926. Thirty officers will be appointed to each course.

AN AMERICAN TWO-SEATER LIGHT 'PLANE—THE "DIXIE"

AN interesting two-seater light 'plane—or "aerial flivver" as our American cousins call it—has recently been produced by the Charles E. Lay Co., of Saybrook Avenue, Cincinnati. This little machine, the general layout of which is indicated by the accompanying sketch-plan and elevations, was designed by Harry Heasel, chief engineer of the firm. As may be seen, the "Dixie," as it is called, is a cantilever monoplane of very clean design. It has a span of 20 ft., an overall length of 14 ft. 6 ins., and a height of 4 ft. 6 ins.

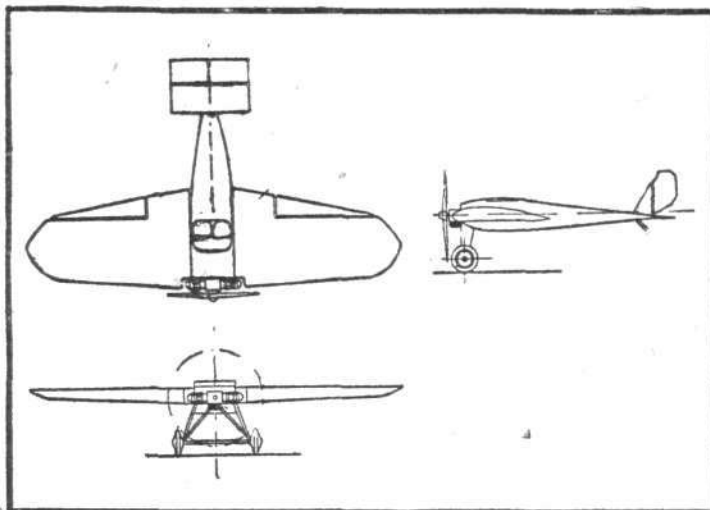
Fitted with a 40 h.p. 2-cyl. horizontally-opposed engine, the "Dixie" has a maximum speed of 100 m.p.h. and a cruising speed of 92 m.p.h. The landing speed is 25 m.p.h., and the range of action is somewhere about 500 miles. In the new model just tested a Göttingen section is employed for the wings, which have a fairly pronounced taper from root to tip; the maximum chord measures 7 ft. 6 ins.

The comparatively wide fuselage is of good streamline shape, and somewhat resembles that employed on the old Morane-Saulnier monoplanes. The two seats are arranged side-by-side, but being located in the centre of the wings we should think that the view forward in a downward direction would not be of the best.

While nothing particularly new is claimed in the "Dixie," a number of well-known and reliable combinations have been placed together, bringing out a small-sized machine that fully accomplishes expectations. Simplicity of construction; absence of wires, struts and all exterior bracings; standard accessories throughout; entirely separate engine installation; ease of assembly and adaptability as a single or two-seater, are just a few of the "Dixie's" characteristics.

It is guaranteed as to performance, materials and quality of workmanship, and it can be supplied with or without engine. In the latter case, engine installation diagrams are furnished free of charge for any class of power plant the

customer may desire to install, provided it does not weigh more than 150 lbs. The range of power plants that can be used on this machine varies from 14 to 40 h.p. The "Dixie" is also supplied in "knockdown" condition, with all parts ready to fit and numbered with assembling instructions.



The weight of this machine empty is 280 lbs. and the load capacity varies from 210 to 360 lbs.; the factor of safety is 9.

We understand that already several of these machines have been sold.

LIGHT 'PLANE CLUB DOINGS

WE shall be pleased to have reports regularly from Club Secretaries, or those directly connected with new Light 'Plane Clubs, so that by keeping our readers informed on this matter the whole movement may be helped forward to the benefit of the clubs and the popularising of "that Air feeling."

Light 'Plane Clubs are being, or have been, formed at:—

London.—Lieut.-Com. H. E. Perrin, Secretary, Royal Aero Club, 3, Clifford Street, W.1.

Birmingham.—Major Gilbert Dennison, Secretary, Midland Aero Club, Handsworth.

Glasgow.—J. Allison, Esq., Jnr., 219, St. Vincent Street.

Lancashire.—C. J. Wood, Esq., Secretary, Lancashire Aero Club, c/o A. V. Roe and Co., Newton Heath, Manchester.

Newcastle-on-Tyne.—Alex. H. Bell, Esq., Hon. Sec., Newcastle-on-Tyne Light 'Plane Club, County Hotel.

Yorkshire.—Prof. G. Brodetsky, Yorkshire Aeroplane Club, Leeds University.

We have received the following report on the progress being made:

Lancashire Aero Club.—The Club held a most successful informal concert at the Manchester Café, Manchester, on Tuesday evening, December 16. Several amusing items were contributed by various members and the Secretary outlined the present position and plans for construction work when the new workroom in Manchester is ready. The object of this concert was to enable new members to get to know each other, and to keep everyone in touch. Mr. R. Mede, who has recently returned from Germany, gave an interesting talk on gliders in Germany to-day; he explained many details of the simple construction of these machines, and outlined what was being done by the glider clubs in that country. This was especially useful, as the Lancashire Aero Club intends to build several gliders to tide over the time until the light aeroplanes are ready.

"AIRCRAFT OF THE WORLD."*

So far we have seldom come across a book written specially for youthful readers dealing with a technical subject that really "gets there." Either the subject is treated in the simplest, or most elementary, form possible, so that the technical knowledge imparted is next to nothing, or else it is technical to the extent that the young reader is inclined to be somewhat scared of perusing the volume from cover to cover.

In however, "Aircraft of The World," by Maj. F. A. de V. Robertson, late R.A.F., we find a work that is not only extraordinarily comprehensive as regards the subject dealt with, but its execution is such that the reader—*young or old*—must be thoroughly interested from start to finish, while, at the same time, receiving a knowledge of the subject that is rather more than general.

The title, we think, however, is somewhat misleading, and does not altogether describe the nature of this book. As a matter of fact, it is really a concentrated history of aviation

and text-book of aeronautics. The Introduction really is an introduction, for in some ten pages Maj. Robertson gives us a brief but concise history of aviation, and a similarly concise "What is" and "Why it is" of the principles of aeronautics. Having thus thoroughly introduced us to our subject, he then proceeds to deal with the various aspects of aviation as follows:—The Royal Air Force; Commercial Flying; Flying in the British Empire; Airships; Seaplanes and Amphibians; Gliders and Light Aeroplanes; Aero Engines; Air Sport; Foreign Aircraft, etc.

The book is well illustrated, not only with reproductions from photographs of various types of aircraft, but also with some excellent coloured plates from the brush of Mr. H. R. Millar, while the frontispiece consists of a reproduction in colours of the beautiful painting, "The Convoy," by Sir John Lavery, R.A., showing, from the car of H.M. airship N.S. 7, a convoy of food-ships being escorted into harbour by airships.

"Aircraft of The World" is, in short, one of the best books on aviation we have had the pleasure of seeing for some time.

* "Aircraft of The World." By Maj. F. A. de V. Robertson. Humphrey Milford, Oxford University Press. Price 7s. 6d. net.

THE ROYAL AIR FORCE

London Gazette, December 16, 1924

General Duties Branch

The following Flight-Lieutenants are granted permanent commns. in the rank stated (Dec. 17):—F. Fernihough, M.C., C. B. Riddle. Pilot Offr. A. G. S. Tuke is promoted to rank of Flying Officer; Dec. 15. Flight-Lieut. P. A. de Fontenay is transferred to Reserve, Class C; Dec. 18. Flight-Lieut. A. C. Sanderson, D.F.C., is placed on half-pay, Scale B, from Nov. 15, 1924, to Nov. 25, 1924, inclusive (substituted for Gazette, Nov. 11). Flight-Lieut. K. A. Lister-Kaye is placed on retired list; Dec. 17.

Stores Branch

The following are granted permanent commns. in the ranks stated (Dec. 17):—Flight-Lieut. H. E. Tansley, M.C. (Lieut. Ches. Regt.); Flying Offr. L. J. V. Bates.

Accountant Branch

Flying Offr. R. G. D. Thomas is granted a permanent commn. in the rank stated; Dec. 17. The following are granted permanent commns. as Pilot Officers on probation, with effect from Dec. 3 and with seny. of Nov. 10:—A. E. West, J. R. Thomas, S. C. George, S. W. Hill, R. W. Collinson, L. M. Spicer, R. C. Dickinson.

Medical Branch

B. W. Cross is granted a short service commn. as a Flying Officer, with effect from, and with seny. of, Dec. 4.

Reserve of Air Force Officers

The following are granted commissions on probation in General Duties Branch, in ranks stated (Dec. 16):—

Class A.—Flying Officers.—L. C. Burcher, A. T. Daw, J. J. Flynn, J. H. Halliwell, J. A. Middleton, M.C., J. E. Sitch. **Pilot Officers.**—E. H. Bird, A. D. M. Blair, T. E. Greenough, E. F. D. Gregory, H. Jones, H. Lyne, A. M. Mackay, F. Middleton, G. H. Smith, B. Spaven, J. H. Taylor, M. A. Vachon, K. C. Whitwell.

Class B.—Pilot Officers.—E. T. Shone, D. M. Tomlinson.

The following are confirmed in rank:—**Flying Officers.**—C. St. C. Parsons; Nov. 20. C. K. Robinson; Nov. 25. C. S. Emery; Dec. 10. **Pilot Officers.**—J. Hall; Nov. 20. R. K. Harvey; Dec. 10.

The following are transferred from Class A to Class C:—**Flying Officers.**—A. W. Saunders, D.F.C.; Dec. 16. J. Hart; Dec. 16. **Pilot Officers.**—J. Woods; Sept. 14.

Princess Mary's Royal Air Force Nursing Service

Miss B. Hamilton resigns her appointment as Staff Nurse; Sept. 22.

Memoranda

The following relinquish their honorary commissions on ceasing to be employed under the Directorate of Works and Buildings: Wing Commander H. J. Nancarrow; Oct. 1. Flying Officer E. R. Green; Oct. 8.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the R.A.F. are notified:—

General Duties Branch

Flying Officers: P. Murgatroyd and G. J. Ross, to H.Q., Iraq. C. E. Horrex, A.F.C., to No. 45 Sqdn., Iraq. H. Stafford and E. R. C. Hobson, D.F.C., to Aircraft Depot, Iraq. (Hon. Flight Lieut.) H. M. Burrows, to No. 1 Sqdn., Iraq. W. L. Dawson, C. S. Riccard and R. H. Carter, to No. 84 Sqdn., Iraq. L. Eardley-Wilmot, J. R. Bowring, M.C., and C. Wilson, to No. 28 Sqdn., India. T. Humble, to No. 20 Sqdn., India. J. G. Western, M.B.E., to No. 27 Sqdn., India. R. J. Willson, to No. 31 Sqdn., India. W. Badley, to Aircraft Depot, India. E. L. W. H. Alms, to No. 5 Sqdn., India. The foregoing are all posted with effect from 27.11.24. C. H. Johnson, to Aircraft Depot, Iraq; 5.12.24. H. V. David, to No. 6 Sqdn., Iraq; 17.11.24. G. A. Kysh, to No. 4 Armoured Car Co., Iraq; 5.12.24. A. T. Laing, to No. 47 Sqdn., Egypt; 11.11.24. F. T. Eades, D.F.C., to H.Q., Palestine; 18.10.24. F. P. Adams, to No. 208 Sqdn., Egypt; 24.11.24. G. H. Huxham, to No. 208 Sqdn., Egypt. 21.11.24.

Pilot Officers: D. T. H. Hooke, to No. 31 Sqdn., India; 27.11.24. D. L. Thomson, to Aircraft Depot, India; 27.11.24. H. S. Dawe, F. G. Jennings and A. G. Moon, to No. 1 Sqdn., Iraq; 27.11.24. H. N. Davies, to No. 30 Sqdn., Iraq; 27.11.24. G. N. J. Stanley-Turner, to No. 208 Sqdn., Egypt; 5.12.24.

Stores Branch

Squadron Leader W. J. B. Curtis, O.B.E., to Stores Depot, Iraq; 27.11.24.

Flight Lieutenants: A. M. Saywood, to Rest Camp, Iraq; 27.11.24. G. F. Law, to H.Q., Iraq; 27.11.24. F. J. W. Humphreys, to No. 3 Armoured Car Co., Iraq; 9.11.24.

Flying Officers: A. McC. Goddard, to Stores Depot, Iraq; 27.11.24. T. Thomson, to No. 84 Sqdn., Iraq; 27.11.24. C. W. Gore, to Aircraft Depot, India; 27.11.24. R. W. Stewart, to No. 14 Sqdn., Palestine; 18.10.24. L. H. Hillier, to No. 45 Sqdn., Iraq; 5.12.24.

Pilot Officer R. G. A. Vallance, to Aircraft Depot, India; 27.11.24.

Silly questions we have been asked:



"I suppose it's rather difficult mending punctures in mid-air?"

R.A.F. TRAINING CENTRES

LAST week was the occasion of two official visits to two of the big Royal Air Force training centres. On December 16 Air Vice-Marshal Sir Philip Game, Air Member for Personnel, presided at the "passing-out" inspection of the flight cadets who have been trained at the R.A.F. Cadet College at Cranwell, while on December 17 Air Chief Marshal Sir Hugh Trenchard, Chief of the Air Staff, visited the No. 1 School of Technical Training (Aircraft Apprentices) at Halton.

At the former function some 110 cadets paraded, out of which number 21 had qualified to be absorbed in the R.A.F. as pilots. Sir Philip was received with the Air Salute, and after inspecting the cadets—who presented an exceptionally smart appearance—and taking the salute at the march past, he made a tour of inspection of the various extremely interesting workshops where the cadets receive their mechanical training. After this Sir Philip distributed the prizes won by the successful cadets during the year. The Sword of Honour, awarded to the best all-round flight cadet in the senior team, was presented to Flight Cadet Under-Officer G. R. Beamish (of Coleraine), who was in command of the Parade. The "R. M. Groves" memorial prize for the best all-round pilot in the senior team was awarded to Flight Cadet Corporal S. H. B. Harris, and the "Abdy Gerrard Fellowes" memorial prize (for the flight cadets obtaining the highest total of marks in mathematics and science) was won by Flight Cadet Sergeant A. H. W. J. Cocks.

Sir Philip then presented the cups won by the cadets in their inter-squadron Rugby and "skill-at-arms" contests, the three trophies being won by "B" squadron.

A new scheme of examination for entry into the Cadet College at Cranwell with a view to obtaining permanent commissions in the Royal Air Force has been approved by the Air Ministry. The scheme differs from the old scheme in that it is specially designed to allow boys of suitable character and ability, whether educated on the classical, scientific, or modern sides of public and secondary schools, to enter the College without special tuition. The subjects of the examination will, therefore, be those taught in the higher forms of schools, and a wide choice of subjects will be given to candidates. It is hoped that this new and more elastic scheme of examination will throw the Royal Air Force open as a permanent career for boys attending public and secondary schools far more widely than has hitherto been the case. The age limits for the examination will remain as at present—17½ to 19 years.

The second function, the visit to Halton, opened with a grand parade, Sir Hugh Trenchard being accompanied by Air Commodore C. A. H. Longcroft (Deputy-Director of Personnel) and Squadron-Leader Nelson (Technical Training branch). He was received by Air Commodore C. L. Lambe, and after the parade an inspection was made of the workshops and school, following which the prizes were presented.

The report for the entry, read by the Commandant, showed that the discipline of the entry which came in on January, 1922, was excellent. The disadvantages attending the early stages of the training had been eliminated, and it was considered that the boys had done fairly well, although a considerably higher standard of practical work would be expected from the later entrants. Fifteen lads had passed as leading aircraftmen, and 121 as aircraftmen I; 191 had reached the aircraftmen II grade, and 67 had failed. Cadetships had been offered to Leading Aircraft Apprentices J. Clark and C. Dicken; and eight lads were being retained for the corporal's course.

Sir Hugh, addressing the lads, said that it was a pleasure for him to come to see the first output from the future home of the Royal Air Force. Very shortly Halton would be the only centre where aircraft apprentices would be trained, with the exception of the wireless centre at Farnborough. He was bitterly disappointed at the results of the examination, the number of leading aircraftman and aircraftmen I was much too small. He could not help believe that the A.C.II's and the failures could pass in a much higher grade if they were given a further opportunity. He was authorised to say that they would be given another chance, and would be retained there for a further six months, at the end of which time he wanted to see them all, or at least the majority of them, pass out as leading aircraftmen. The Air Force was a very young Service, but it had the traditions of the war. Its engines and machines were kept in the air then by the mechanics of those war days, and if the air mechanics of this and the future days could keep the machines in the air for longer periods, then they would have done their share to make the Air Service great. He added that some of the lads passing out now, after a year's work, would be selected for training as pilots, and would then have a great opening offered to them. The next entry of lads is in January, and for entries immediately following approximately 600 lads are wanted to sit for the entrance examinations, particulars of which can be obtained from the Air Ministry.

Anniversary Congratulations for Orville Wright

SIR SAMUEL HOARE, Secretary of State for Air, sent the following cable to Orville Wright, on the occasion of the 21st anniversary (December 17, 1903) of the first free flight in a power-driven aeroplane at Kitty Hawk:—

"I send you this telegram of congratulatory good wishes

on the occasion of the coming of age of the power-driven heavier-than-air machine. The development of the aeroplane since your magnificent pioneer achievement of 21 years ago has been remarkable; but I am convinced that, with the friendly co-operation of the British Empire and the U.S.A., aviation has an even greater future before it."



FOREIGN INTEREST IN THE MARTINSYDE A.D.C.1: The above photograph was taken on the occasion of a demonstration of the successful and latest production of the Aircraft Disposal Co., at Waddon. The group, reading from left to right, includes Maj. J. Stewart (Sales Manager of the A.D.C.), Col. M. O. Darby (Managing Director), Capt. T. Toyoda (Japanese Naval Attache), Capt. Cortijo (Spanish Royal Naval Commission), Lieut. Comdr. Kato (Imperial Japanese Navy), and Capt. Square (Spanish representative of the A.D.C.).

AIR POST STAMPS

By DOUGLAS B. ARMSTRONG

Aero Stamps in 1924

FIFTY-SIX new varieties of official air post stamps and a large number of semi-official vignettes and cachets testify to progress in the aerial transport of mails throughout the world in the year of grace 1924.

Air post collectors may find cause for gratification in the fact that a considerable proportion is already obsolete, and rising in value. For instance, the short-lived Uruguay issue originally sold for 5s. the set of three, is now quoted at double that figure, and will go higher. The first "Syrie-Grand Liban" series, which could be had for 4s. when first issued, today fetches 30s. "Flown covers" of the Berlin-Angora air post also realise 30s., as against 17s. 6d. a couple of months ago; so that Aerosemists who have been far-sighted enough to take everything as it came along, should be able to show a satisfactory profit on the year, although it is far from our intention to suggest that financial gain is the main object of the true enthusiast in air post collecting.

In addition to those above referred to, new air post stamps have been issued during the year in Germany, Esthonia, Danzig, Lithuania, Russia, Switzerland, Hungary and Austria, whilst the Spanish series has been withdrawn from use after a currency of four years. The most notable from an artistic viewpoint are the Swiss air post stamps with their symbolical figure of Icarus, and the Hungarian series—showing the Spirit of Flight hovering over the Danube.

Air Post Collection at Auction

KEEN interest has been aroused amongst air post collectors over the forthcoming sale by auction of the Taylor collection of aero stamps and covers which is to come under the hammer next month. As this is the first occasion upon which a complete aero collection has been put up for sale, and that one of the foremost in the country, the result will be closely followed. It is anticipated that some of the well-known rarities will reach figures calculated to make sceptics open their eyes.

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British Aircraft Accessories at Brussels: The above display of aircraft parts, supplied by Brown Bros., Ltd., of Great Eastern Street, London, E.C.2., was exhibited by Callier Freres in the Aeronautical section of the Brussels Motor Exhibition.

PUBLICATIONS RECEIVED

Department of Overseas Trade. Report on Some Aspects of British Trade in India, April, 1923, to March, 1924. By T. M. Ainscough. H.M. Stationery Office, Kingsway, London, W.C. Price 3s. net.

Transactions. November, 1924. Volume LXVIII. Part I. The Institution of Engineers and Shipbuilders in Scotland, Elmbank Crescent, Glasgow.

British Standard Classification of Pure Mineral Lubricating Oils. No. 210-1924. British Engineering Standards Association, 28, Victoria Street, London, S.W.1. Price 1s., by post 1s. 2d.

Radio Research Board, Special Report No. 2: Variations of Apparent Bearings of Radio Transmitting Stations. Part I.—Observations on Fixed Stations, February, 1921—March, 1922. H.M. Stationery Office, Kingsway, London, W.C. Price 3s. 6d. net.

Air Power and War Rights. By J. M. Spaight. London: Longmans, Green and Co. Price 25s. net.

Le Vol a Voile Dynamique des Oiseaux. By Louis Breguet. Paris: Gauthier-Villars et Cie., 55, Quai des Grands-Augustins. Price 8 francs.

Handbook on the 325 h.p. Jaguar III Aero Engine. Air Publication 1082. H.M. Stationery Office, Kingsway, London, W.C.2. Price 2s. net.

Ce Que Tout Aviateur Doit Savoir. By Andre Laine. Gauthier-Villars et Cie., 55, Quai des Grands-Augustins, Paris. Price 12 francs.

The Official Gazette of the United States Patent Office. November 4, 1924. U.S. Government Printing Office, Washington, D.C., U.S.A.

The Air Pilot Monthly Supplement, No. 1. November, 1924. Air Ministry, Kingsway, London, W.C. 2.

Catalogues

De Havilland Aircraft. The De Havilland Aircraft Co., Ltd., Stag Lane Aerodrome, Edgware, Middlesex.

A.C. Cars. A.C. Cars, Ltd., 55-56, Pall Mall, London S.W.1.

Cygnal Components. The London Piston Ring Co., Ltd., 60-66, Rochester Row, Westminster, London, S.W. 1.

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AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1923

Published December 24, 1924

- 19,220. GLOUCESTERSHIRE AIRCRAFT CO., LTD., H. P. FOLLAND and H. E. PRESTON. Means for injecting fuel into i.c. engines. (225,257.)
- 21,661. A. J. J. CHENU. Renewal of the light gas contained in aerostats, etc. (205,059.)
- 21,662. A. J. J. CHENU. Renewal of the light gas contained in aerostats, etc. (208,511.)
- 22,540. D. J. MOONEY. Metal framework for aircraft. (225,307.)
- 27,918. A. KOBLITZ. Aerial machines. (206,519.)
- 27,924. V. C. RICHMOND and G. H. SCOTT. Control, stability, and ventilation of rigid airships. (225,353.)

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